Appendix C Technical Baseline Study – Executive Summary

EXECUTIVE SUMMARY

This report presents the results of an ecological baseline study for a proposed wind energy development project by SeaWest, Inc. near Condon, Oregon. The proposed project would provide up to 50 MW of electricity generated by 600-kW wind turbines. The first phase of the project would consist of 41 wind turbines and the second phase would consist of 42 turbines. URS Corporation and subcontractors Northwest Wildlife Consultants, Western EcoSystems Technology, Inc., Loverna Wilson, John Hayes, and David Waldien conducted the study. This study and report provides supporting documentation to the Environmental Impact Statement being prepared by the Bonneville Power Administration (BPA) and Jones & Stokes, Inc. Prior to initiation of the field study, a proposed protocol describing the methodology to be followed was discussed with representatives from BPA, the Oregon Department of Fish and Wildlife, and the U.S. Fish and Wildlife Service. The protocol was revised in response to those comments.

The general goal of the study was to gather information in sufficient detail to accurately characterize the quality and quantity of vegetation, wetlands, fish and wildlife (including any State or Federal Threatened, Endangered, and Sensitive species) present in the vicinity of the proposed project, and to provide a basis for identifying probable ecological impacts of a wind power project in the area. More specific goals are listed below in the form of a series of questions:

- What fish and wildlife species use the study area? Are there seasonal variations in species composition and use? What vegetation/habitat types are present in the study area?
- What is the status of threatened, endangered, and sensitive plant and animal species in the study area?
- Where in the study area do species occur and what habitats do they use? Do some fish or wildlife species or groups appear to make more use of some portions of the study area than others?
- Are there key habitat features, biotic and abiotic, that appear correlated with variations in plant distribution and fish and wildlife use of the area?
- Does an individual fish and wildlife species or species group exhibit distinctive behavior patterns over specific habitats and landforms? Does behavior exhibit diel or seasonal patterns?
- How do indices of use of the study area by birds compare to other windplant sites that have been studied in western North America, particularly in Oregon, Wyoming, Minnesota, and California?

The Condon study area (SA) consists of broad, flat, mostly cultivated ridgetops with some grazed native rangeland (shrub-steppe and grasslands) and Conservation Reserve Program (CRP) seeded fields, and grazed native rangeland on the adjacent canyon slopes. The SA is located along Highway 206 approximately 3 to 5 miles northwest of Condon, Oregon; 24 miles south of the Columbia River, and 9.5 miles east of the John Day River. The SA is within the Columbia Basin Physiographic Province (Franklin and Dyrness 1973) of which the original vegetation was grassland and shrub-steppe of the bluebunch wheatgrass-Idaho fescue zonal association. There are few trees and rocky outcrops in the SA.

Color aerial photography was specifically commissioned for this study and used in addition to USGS 7.5-minute quadrangle maps as the basis for vegetation mapping and field data sheets in the study. Vegetation was categorized and mapped on an aerial photo mosaic using the information gathered during ground surveys. Ground surveys by a botanist and wildlife biologist were conducted in the SA and by a fisheries biologist in areas downstream and outside of the SA, during the spring of 2000. These surveys were designed to search potentially suitable habitats for sensitive plants and animals, identify wetlands, and characterize vegetation communities. A helicopter aerial survey of tree- and cliff-nesting raptors was conducted within a 10-mile radius of the area where wind turbines could be developed. Avian use surveys were conducted weekly (twice weekly in the spring) at a series of 16 circular plots 1200 meters in diameter between April 13, 2000 and March 13, 2001. Plots were selected to cover as much of the SA as possible, within the limitations imposed by the terrain. The bat study methods included an assessment of suitability of habitat within and near the SA as well as surveys of bat activity using mist netting and echolocation monitoring at selected sites.

Ten vegetation/habitat types were identified within the SA: agricultural (cultivated) dry, upland trees, riparian trees, riparian (lacking trees), shrub-steppe, CRP and grassland, developed residential, surface water, emergent wetlands, and rocky outcrops. Four wetlands were found within the SA. One wetland within plot 15 was exceptional in that it consisted of several small vernal pools within an area of remarkably undisturbed bluebunch wheatgrass in which the cryptobiotic crusts are thick and unbroken.

No federal or state listed or sensitive plant species were observed in or near the SA during field surveys. Six sensitive animal species were observed during the field study in the SA: long-billed curlew (probably nesting locally, not necessarily within the SA), Swainson's hawk (local summer resident, nesting outside the SA but within 10 miles), loggerhead shrike (may nest locally, not necessarily within the SA), sage sparrow (status unknown, possible migrant or local nester), grasshopper sparrow (summer resident, probably nests within SA), and silver-haired bat (fall migrant passing through the SA). Other "sensitive" species (state and federal) that could be affected by wind turbines and that may occasionally occur, but which were not observed during the field study, include bald eagle, a few species of bats, ferruginous hawk, and western burrowing owl.

In 2000, a total of 13 active raptor nests were identified during the aerial survey within the required 10-mile radius (consisting of 135,714 hectares) of the plots. This aerial survey documented an average of only 1.0 active large raptor nests (excluding common ravens) per 10,000 hectares within the 10-mile radius of the SA during the 2000 surveys. This density is low compared to densities estimated from similar surveys at the Vansycle/Stateline wind site in Oregon (3.9 to 7.8 nests per 10,000 hectares) and Foote Creek Rim in Wyoming (7 nests per 10,000 hectares). The raptor species observed during aerial surveys included red-tailed hawks (4 active nests), unknown raptors (4), Swainson's hawks (3), and prairie falcons (2). Great horned owl and golden eagle nests were observed beyond the 10-mile radius. Common ravens were also recorded during the aerial survey and were the most abundant nesting species observed (6 nests).

During the avian use plot surveys a total of 50 bird species or best possible identification was recorded. Horned lark comprised 40 percent of the total birds counted, raptors 11 percent, western meadowlark 10 percent, waterbirds 3 percent, and upland game birds 1 percent. The other 35 percent of the total consisted of mostly other species of passerine birds such as sparrows, blackbirds, and common ravens, the only corvid observed. American kestrel was the most frequently observed raptor, followed by unidentified buteos, red-tailed hawk, northern harrier, rough-legged hawk, unidentified raptors, and golden eagle. Most of the "unidentified" birds were those recorded farther than 600 meters from the observer.

Overall, more species were observed in the SA during the spring and summer (26 and 28 respectively) than during the fall (15) and winter (14). However, the number of species/ unique groups identified per 15-minute plot survey was significantly higher in the spring than during the other seasons. There were no statistically significant differences between indices of use by any bird group or season between the plots within the proposed project area (the PA, where wind turbine development is proposed) and the plots outside the proposed project area (the OSPA). An analysis of seasonal differences within all of the plots combined (the Condon Analysis Area or CAA, consisting of the plots in the PA and OSPA) revealed that corvid use was significantly higher during the fall than other seasons. Raven use was highest of all large bird species and groups in the CAA in the summer, fall, and winter and was second-highest in the spring. Raven use in the fall was approximately ten times that of the next species (abundant in this case refers to an index of use, not true abundance). Raptor use was highest during spring but not quite significantly different from the other seasons. Use by the horned lark/meadowlark group was significantly lower during the summer than all the other seasons. Sparrows were only seen during the fall and winter, with the exception of grasshopper sparrow, which was observed in spring and summer. Combined use by all birds was significantly higher in summer than other seasons.

The ten large bird species, whose use in at least one season was in the top ten species, were the common raven, American kestrel, ring-necked pheasant, northern harrier, long-billed curlew, red-tailed hawk, gray partridge, golden eagle, rough-legged hawk, and turkey vulture. Small bird species in the "top ten" in at least one season were the horned lark, western meadowlark, vesper sparrow, and savannah sparrow.

No apparent consistent patterns in use across seasons by plot for the groups that were analyzed (raptors, passerines, non-passerines, all birds) were evident.

The analysis of flight heights from the plot surveys included calculations of the percentages of flying birds that would pass through the rotor swept area (RSA) of three different size classes of wind turbine: small (600-750 kW), medium (900-1000 kW), and large (1500-1650 kW). Three turbine sizes were used for the analysis because the type of turbine to be used for this project had not been chosen. Of all observations of flying birds, 34 percent were recorded within the RSA for small and medium turbines, and 16 percent were within the RSA for large turbines. For groups with at least 20 flocks observed flying, blackbirds (84 percent), swallows (45 percent), and “others” (45 percent) were most often observed within the RSA of the small and medium sized turbines, while horned larks/meadowlarks (25 percent) and sparrows (none) were least often observed within the RSA and were mostly observed below the RSA. Swallows (40 percent), raptors (29 percent), corvids (28 percent), and “others” (22 percent) were most often observed within the RSA of the large turbines, with horned larks/meadowlarks (11 percent) and blackbirds (10 percent) least likely to occur. The blackbird estimates vary between the two turbine types due to the large number of blackbirds recorded at 25 meters above ground level (AGL).

A total of 83 percent of all birds observed were first recorded as flying. For groups with at least 20 flocks observed flying, sparrows (54 percent flying) had the lowest estimates and horned larks/meadowlarks (78 percent), raptors (86 percent), and swallows (96 percent) had the highest estimates.

Of the seven raptor species with greater than five observations of flight height, turkey vultures (10 percent), northern harriers (19 percent), golden eagles (19 percent) and Swainson’s hawks (22 percent) were least likely to fly within the RSA of the small/medium sized turbines. Rough-legged hawks (79 percent), American kestrels (38 percent), and red-tailed hawks (34 percent) were most likely to fly within the RSA of the small/medium-sized turbines. For the large sized turbines, the proportions of raptors likely to fly within the RSA were lower than the estimates for birds flying within the RSA for the small/medium-sized turbines. In some species, such as the golden eagle and Swainson’s hawk, the percentage of flights through the RSA of the large-sized turbines was half of that recorded for the small/medium-sized turbines.

Flight direction when first observed showed no evident pattern. Maps of flight paths varied by season, species, and location, and no obvious patterns of use were evident. Flight paths often followed elevation contours, especially near distinct canyon edges, such as the east edge of Ferry Canyon. This pattern is similar to that observed at Foote Creek Rim (Johnson et al. 2001).

Potentially suitable habitat for bats is generally scarce throughout the SA. Few trees, snags, and rocky areas are present. Farm buildings are scattered throughout the SA. Few water sites, particularly during the late summer and fall, are present in the SA. Bat activity was low at upland sites but myotis (which could not be identified to species), big brown, and State Sensitive silver-haired bats were detected. Considerable activity at stream and pond sites at and in the vicinity of the SA was detected, but only myotis species were identified. Myotis species were also recorded at various mobile sample points: the area with the most activity was a riparian area along Ferry Canyon. No bats were captured by mist netting at ponds. Although myotis calls could not be definitively identified to species, most of the calls recorded were typical of little brown bats and several were typical of California myotis.

Small birds most often observed in the zone of risk were horned larks, blackbirds (unidentified and Brewer's blackbirds), western meadowlarks, swallows (cliff and unidentified), and American goldfinches. Horned larks and blackbirds were both estimated to be greater than seven times more likely to be found in the zone of risk than any other small birds. Note that of these species, only a horned lark was represented in the list of carcasses found during the one-year monitoring study at the Vansycle Wind plant in northeast Oregon, and it may have been killed by a car collision (Erickson et al. 2000). Horned lark was the most commonly observed passerine at the Foote Creek Rim Wind plant in Wyoming, had the highest risk index, and was the most abundant turbine-related collision observed.

Large birds most likely to be observed in the zone of risk are rough-legged hawks, American kestrels, common ravens, and northern harriers. The golden eagle is estimated to be 10 times less likely to be observed in the zone of risk than American kestrels and approximately 20 times less likely than common ravens.

Raptor relative use estimates for the Condon SA were compared to estimates from other wind plants where comparable data exists. Raptor use estimates were taken from three studies where data were collected from fixed-radius survey plots using protocols very similar to the protocol used on the Condon study. Monitoring studies included the Buffalo Ridge Wind Resource Area (WRA), Minnesota in 1996-1999 (Johnson et al. 2000a); the monitoring studies at the Foote Creek Rim WRA in 1995, 1997, 1998 and 1999 (Johnson et al. 2000b, 2001); and the Stateline monitoring study (CH2M Hill 2000). Due to differences in the time of surveys and possible differences in the quality of viewsheds out to 800 meters, some biases may exist.

Of the four sites, the estimated raptor use is highest during the spring, summer and fall at the Foote Creek Rim Wind Plant. During the winter, raptor use is highest at the Vansycle Wind Plant. Otherwise, similar use estimates exist for the CAA, the PA, the Vansycle WRA, and the Buffalo Ridge Project area, with none of these studies having consistently higher or lower raptor use estimates across all seasons. No turbine-related raptor fatalities were observed during a one-year monitoring effort at the Vansycle Wind Plant (Erickson et al. 2000) and only one red-tailed hawk fatality was found during a 5-year monitoring effort at the Buffalo Ridge WRA. Three turbine-related raptor fatalities (3 American kestrels, 1 northern harrier and 1 short-eared owl) were observed at the Foote Creek Rim Phase I Windplant (69 turbines) during two years of monitoring (Johnson et al. 2001). Comparisons of all bird use estimates was only appropriate for this study and the Vansycle baseline study, since the Buffalo Ridge and Foote Creek Rim surveys were conducted at points with 800-meter diameter viewsheds and only recorded large birds and species of concern. Estimates of all bird use were higher at the Vansycle WRA and the Vansycle Existing Project Area than at the CAA or PA in summer, fall, and winter and were comparable in the spring.

Fatality estimates from the Vansycle Wind plant (Erickson et al. 2000), the Buffalo Ridge Wind plant (Johnson et al. 2000a), and the Foote Creek Rim Wind plant (Johnson et al. 2001) for raptors and all birds were compared and used as a basis for estimating the range of fatalities that could be expected at the Condon project. Assuming 83 turbines at Condon and using the mean from these previous studies, it is estimated that an average of one raptor would be killed per year with an estimated range of 0–3 raptor fatalities per year. This average estimate and upper range is probably conservative (an overestimate) because raptor use at the Condon Site is similar to Buffalo Ridge and Vansycle, and the projection for raptor fatalities at Condon from these two wind plants is 0-0.2 raptors per year. Foote Creek Rim raptor use estimates and nesting densities are much higher than the corresponding estimates at the Condon Site, and the Foote Creek Rim raptor fatality estimate is the basis for the upper range of raptor mortality (3 raptor fatalities per year). Using the mean all bird fatality estimates from these three studies, we estimate 144 bird fatalities (in general) per year with a range of 52-235. The estimate from the Vansycle Windplant may be the most accurate (52) because bird use estimates for the Condon Site are similar to the Vansycle estimate.

Based on the 1-year monitoring study of the Vansycle Wind plant (Erickson et al. 2000), bat mortality averaged 0.74 bats/turbine/year. Assuming 83 turbines and approximately this mortality average, an estimated average of 61 bat fatalities could occur at the Condon project per year. Actual fatalities may vary from these projections. Using the confidence interval reported for Vansycle, we estimate a range of 22 to 125 bat fatalities per year.

Mitigation opportunities include:

- Select turbine sites carefully to reduce risk of collision. Some research has indicated higher raptor use along the upwind side of distinct ridgelines (Johnson et al. 2000b). Turbines at the Foote Creek Rim wind plant in Wyoming were set back from the upwind side of the distinct ridge edge because of this observed pattern. This may have contributed to the low raptor mortality (Johnson et al., 2000b). At the Condon Wind Project, turbines are proposed to be set back from the upwind (prevailing) side of distinct ridges and would be located on the top or the downwind side. Turbines should also not be located in low saddle areas that could be used frequently by raptors moving between drainages.
- Minimize any man-made perches and nesting structures associated with the wind development. The use of tubular towers with the cells of the turbines encased should minimize perching attempts on turbine structures by raptors.

- Avoid aboveground transmission lines where feasible, and raptor-proof lines when they are above ground. Consider topography when siting aboveground lines.
- Delineate and clearly flag wetland boundaries within the construction corridor prior to project implementation and plan construction so as to avoid impacts to wetlands.
- Minimize road construction and restrict vehicle use to avoid and minimize impacts to sensitive habitats and ground-dwelling species.
- Educate construction personnel about maintaining reasonable driving speeds within the PA so as not to harass or accidentally strike wildlife. All construction personnel should be instructed to be particularly cautious and drive slower speeds from one hour before sunset to one hour after sunrise when some wildlife species are the most active. This should be a standard safety requirement throughout the construction and operational phase. Construction personnel should be given a briefing on sensitive wildlife in the area, and on required precautions to avoid harming wildlife.
- Revegetate any unfarmed disturbed areas using native plant seeds. Monitor revegetation to assure the success of the revegetation effort.
- Install and maintain best management practices for erosion control pursuant to an NPDES Stormwater General Permit 1200-C.
- Develop and implement measures to reduce the potential spread of noxious weeds in consultation with the appropriate weed control board of Gilliam County. Regularly monitor turbine strings, roads, and other disturbed areas to control the spread of noxious weeds.
- Form a technical advisory committee made up of experts from the cooperating agencies, SeaWest representatives, and other concerned groups to meet and discuss the results of the baseline study and to develop and oversee a monitoring plan to be implemented if the project is constructed.
- Avoid placing turbines where raptors have been consistently observed crossing over higher points on the landscape or where high foraging activity has been observed.
- Do not increase perch availability for raptors near turbine strings. Overhead T-line poles should be >1,000 feet away from the nearest turbine string.
- Assign a wildlife biologist to monitor the staking of turbine locations.

References

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DOE/BP-3376 MAY 2001 100